



Office of Energy Efficiency
and Renewable Energy



Advanced Catalyst for Clean CIDI Engines

Background

Compression-ignition direct-injection (CIDI) engines have the highest thermal efficiency of any proven automotive power plant. They are excellent candidates for use in conventional or hybrid vehicle propulsion systems and are expected to deliver a fuel economy of up to 80 mpg in vehicles being developed by the Partnership for a New Generation of Vehicles (PNGV).

Before widespread use of CIDI engines in the domestic light-duty market can become a reality, however, emissions from the engines must be reduced. To overcome this technical barrier, advanced materials for catalytic converter systems that reduce nitrogen oxide (NO_x) emissions from CIDI engines are being developed by the U.S. Department of Energy and Daimler-Chrysler Corporation, Ford Motor Company, and General Motors Corporation.

Accomplishments

- ◆ A full-size, 110-cubic-inch catalytic converter was built using materials developed by the program. The converter was tested with a CIDI engine on a dynamometer. A 40% NO_x reduction, more than double the reduction provided by commercially available catalysts, was demonstrated.
- ◆ This collaborative effort included scientists and engineers from five government laboratories. The breakthrough in automotive catalysis won the first Vice-President's PNGV Award in March 1997.

"The Partnership for a New Generation of Vehicles will produce new cars for a new century. This collaboration is a shining example of the public good that comes from cooperative ventures among industry, government, and communities."

— Vice President Al Gore, PNGV
Medal Award Ceremony, the
White House, March 31, 1997



Prototype NO_x - Reducing Catalytic Converter

Benefits

- ◆ CIDI engines could increase fuel economy by up to 35% compared with present-day engines.
- ◆ If emissions can be reduced, PNGV vehicles can benefit from the CIDI engine's advantages of reliability, durability, and low cost as well as from a well-established sales, service and refueling infrastructure.

Future Activities

- ◆ Develop new catalytic materials that can be used in conjunction with other measures to further reduce the NO_x to more stringent proposed standards (i.e., 0.05 g/mile).

Partners in Success

Lawrence Livermore National Laboratory
Los Alamos National Laboratory
Oak Ridge National Laboratory
Sandia National Laboratories
Argonne National Laboratory
DaimlerChrysler Corporation
Ford Motor Company
General Motors Corporation

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